

ABSTRACT

An improved semiconductor position-sensitive radiation detection device based on a photodiode array formed in a substrate. In one embodiment, the substrate has a first surface and a second surface opposing the first surface. The first surface is electrically conducting to provide a common bias potential to the photodiodes and is optically transparent to receive input photons to be detected. The device includes a grid of conducting wires formed over and in electrical contact with the first surface and configured to define an array of pixels corresponding to the array of photodiodes. A scintillation array of scintillation elements can be coupled to match the pixels defined by the grid of conducting wires and to convert incident radiation at a first wavelength outside the characteristic spectral response range of the substrate into secondary photons at a second wavelength within the spectral response range of the substrate. The scintillation array includes optically reflective surfaces disposed between the scintillation elements to optically isolate one scintillation element from another.

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